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Filing date: **09/23/2010**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD

Proceeding	92050789
Party	Plaintiff Nartron Corporation
Correspondence Address	HOPE V. SHOVEIN BROOKS KUSHMAN P.C. 1000 TOWN CENTER, 22ND FLOOR SOUTHFIELD, MI 48075 UNITED STATES rtuttle@brookskushman.com, hshovein@brookskushman.com
Submission	Plaintiff's Notice of Reliance
Filer's Name	Hope V. Shovein
Filer's e-mail	hshovein@brookskushman.com, rtuttle@brookskushman.com, lsavage@brookskushman.com
Signature	/hope v shovein/
Date	09/23/2010
Attachments	NAR0221OC - First Notice of Reliance 092310.pdf ( 5 pages )(73641 bytes ) 1 - SMART TOUCH Reg Cert 1681891 and TARR 092310.pdf ( 6 pages )(1261933 bytes ) 3 - Car Tech Trends 2010 - MSN Autos 121209.pdf ( 13 pages )(1117213 bytes ) 4 - Virtual Revolution - aei-online.org May 2009.pdf ( 5 pages )(391276 bytes ) 2 - Cadillac News 041009.pdf ( 7 pages )(550603 bytes ) 5 - AECCafe Article 050907.pdf ( 3 pages )(72865 bytes ) 6 - Smart Touch Sensing - SAE Oct 2009 - Washeleski Ex 9.pdf ( 4 pages )(165041 bytes ) 7 - Freep.com GM gives contract HP 072110.pdf ( 3 pages )(580572 bytes ) 8 - HP Financial News re GM 072110.pdf ( 3 pages )(70502 bytes ) 9 - HP in the Motor City.pdf ( 4 pages )(240472 bytes )

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD**

**NARTRON CORPORATION**

Petitioner,

v.

Cancellation No. 92050789

**HEWLETT-PACKARD  
DEVELOPMENT COMPANY, L.P.,**

Respondent.

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**PETITIONER'S FIRST NOTICE OF RELIANCE**

In accordance with Rule 2.122 of the Trademark Rules of Practice, Petitioner Nartron Corporation submits its notice of reliance on the following documents, true copies of which are annexed hereto as Exhibits 1-17:

**Printed Publications (Registrations Owned by Party):**

- (1) A copy of Petitioner's U.S. Registration No. 1,681,891 for the SMART TOUCH trademark for "electronic proximity sensors," a TARR ("Trademark Applications and Registrations Retrieval") printout showing current status and title of the same, and portions of the application file history (namely, a specimen of use).<sup>1</sup>

**Other Printed Publications:**

- (2) "Auto shows turn heads for Reed City Company," *Cadillac News*, April 10, 2009, available at [http://www.cadillacnews.com/news\\_story/?story\\_id=783505&year=2009&issue=20090410](http://www.cadillacnews.com/news_story/?story_id=783505&year=2009&issue=20090410), accessed September 23, 2010 (also produced as Washeleski Dep., Ex. 3).

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<sup>1</sup> Trademark Rule 2.122(d), 37 C.F.R. § 2.122(d), allows for the filing of TESS copies of registrations to establish the status and title of registrations owned by a party.

- (3) “Car Tech Trends for 2010 – and Beyond,” Autos.MSN.com, December 12, 2009, available at <http://editorial.autos.msn.com/article.aspx?cp-documentid=1094624>, accessed September 23, 2010 (excerpt from same article produced as Washeleski Dep., Ex. 4).<sup>2</sup>
- (4) “Virtual revolution – Liquid crystal displays are replacing analog gauges to give drivers more information in a reconfigurable format,” Automotive Engineering ([aei-online.org](http://aei-online.org)), Vol.117 No.5, May 2009 (also produced as Washeleski Dep., Ex. 6).
- (5) “Cypress’s PSoC® CapSense Enables Touch Sensing Inside HP Compaq Notebook PCs,” AECCafe.com, May 9, 2007, available at <http://www10.aeccafe.com/nbc/articles/1/388459/Cypress-PSoCR-CapSense-Enables-Touch-Sensing-Inside-HP-Compaq-Notebook-PCs>, accessed September 23, 2010 (identical article printed October 12, 2009 from AECCafe.com produced as Petitioner’s Bates Nos. N000000005– 6 and Washeleski Dep., Ex. 15).
- (6) “Smart Touch® Sensing Places the Power of the Microprocessor at Your Fingertip,” SAE Int. J. Passeng. Cars – Electron. Electr. Syst. October 2009 2:159-162 (also produced as Washeleski Dep., Ex. 9).
- (7) “GM gives \$2B contract to Hewlett Packard,” Freep.com, July 21, 2010 (also produced as Washeleski Dep., Ex. 23).

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<sup>2</sup> “[I]f a document obtained from the Internet identifies its date of publication or date that it was accessed and printed, and its source (e.g., the URL), it may be admitted into evidence pursuant to a notice of reliance in the same manner as a printed publication in general circulation in accordance with Trademark Rule 2.122(e).” *Safer, Inc. v. OMS Investments, Inc.*, Opposition No. 91176445 (February 23, 2010) [precedential] (emphasis in original).

- (8) “General Motors Renews \$2 Billion HP Enterprise Services Agreement Supporting Vehicle Design and Production,” HP.com, July 21, 2010, accessed September 1, 2010 (Washeleski Dep., Ex. 24).
- (9) “HP in the Motor City,” available at <http://h30507.www3.hp.com/t5/The-Next-Big-Thing/HP-in-the-Motor-City/ba-p/81813>, accessed September 23, 2010 (also accessed September 1, 2010 and produced as Washeleski Ex. 25).
- (10) “HP solutions for the automotive industry,” available at [http://h20338.www2.hp.com/enterprise/downloads/COL\\_FINAL\\_8\\_Pg\\_New\\_Auto\\_Bro\\_LOW\\_RES.pdf](http://h20338.www2.hp.com/enterprise/downloads/COL_FINAL_8_Pg_New_Auto_Bro_LOW_RES.pdf), accessed September 23, 2010 (also accessed September 1, 2010 and produced as Washeleski Ex. 28).
- (11) “Improving automotive industry outcomes,” available at <http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA1-4190ENN.pdf>, accessed September 23, 2010 (Petitioner’s Bates Nos. N49– N60; Washeleski Ex. 20).
- (12) Hewlett-Packard Company’s Annual Report on Form 10-K for the fiscal year ended October 31, 2008, available at <http://sec.gov/Archives/edgar/data/47217/000104746908013240/a2189375z10-k.htm>, accessed September 23, 2010 (also accessed October 19, 2009, excerpt produced as Washeleski Dep. Ex. 21).


Exhibits 2-11 are articles, news briefs and brochures retrieved from the internet and Westlaw, relevant to show the parties’ presence in the automotive industry, evidencing similar trade channels, market interface, and the potential for confusion.

Exhibit 12 is a copy of Hewlett-Packard Company's Annual Report on Form 10-K for the fiscal year ended October 31, 2008, which is also relevant to show similar trade channels, market interface, and the potential for confusion.

**Discovery Responses:**

- (13) Respondent's September 9, 2009 Initial Disclosures.
- (14) Respondent's April 8, 2010 Responses to Petitioner's First Set of Interrogatories.<sup>3</sup>
- (15) Respondent's April 8, 2010 Responses to Petitioner's First Set of Rule 34 Requests.
- (16) Respondent's July 8, 2010 letter to Petitioner's counsel regarding discovery responses and document production, including Respondent's July 8, 2010 Privilege Log.
- (17) Respondent's July 8, 2010 Responses to Petitioner's First Set of Requests for Admission.

**BROOKS KUSHMAN P.C.**

By:   
**ROBERT C.J. TUTTLE**  
**HOPE V. SHOVEIN**  
1000 Town Center,  
Twenty-Second Floor  
Southfield, Michigan 48075  
(248) 358-4400

*Attorneys for Petitioner*

Dated: **September 23, 2010**

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<sup>3</sup> Documents provided as all or part of an answer to an interrogatory may be made of record, as an interrogatory answer, by notice of reliance filed in accordance with 37 CFR §§ 2.120(j)(3)(i) and 2.120(j)(5).

**CERTIFICATE OF SERVICE**

I hereby certify that a true and complete copy of **PETITIONER'S FIRST NOTICE OF RELIANCE** has been served on September 23, 2010 by:

\_\_\_ delivering

✓ mailing (via First-Class mail)

a copy to:

MARTIN R. GLICK  
DIANA D. DiGENNARO  
HOWARD, RICE, NEMEROVSKI,  
CANADY, FALK & RABKIN  
Three Embarcadero Center  
Seventh Floor  
San Francisco, CA 94111

*Attorneys for Respondent*



\_\_\_\_\_  
Hope V. Shovein

**CERTIFICATE OF MAILING**

I hereby certify that **PETITIONER'S FIRST NOTICE OF RELIANCE** is being deposited with the United States Postal Service with sufficient postage as First-class mail in an envelope addressed to:

UNITED STATES PATENT AND TRADEMARK OFFICE  
Trademark Trial and Appeal Board  
P.O. Box 1451  
Alexandria, VA 22313-1451

On this 23<sup>th</sup> day of September, 2010.



\_\_\_\_\_  
Hope V. Shovein

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
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Petitioner,

v.

Cancellation No. 92050789

HEWLETT-PACKARD  
DEVELOPMENT COMPANY, L.P.,

Respondent.

---

**EXHIBIT 1**

**Int. Cl.: 9**

**Prior U.S. Cl.: 21**

**United States Patent and Trademark Office**

**Reg. No. 1,681,891**

**Registered Apr. 7, 1992**

**TRADEMARK  
PRINCIPAL REGISTER**

**SMART TOUCH**

**NARTRON CORPORATION (MICHIGAN CORPORATION)  
5000 N. U.S. 131  
REED CITY, MI 49677**

**FIRST USE 12-17-1986; IN COMMERCE  
1-7-1988.**

**SER. NO. 74-168,921, FILED 5-22-1991.**

**FOR: ELECTRONIC PROXIMITY SENSORS  
AND SWITCHING DEVICES, IN CLASS 9 (U.S.  
CL. 21).**

**CORA ANN MOORHEAD, EXAMINING ATTORNEY**



Thank you for your request. Here are the latest results from the TARR web server.

This page was generated by the TARR system on 2010-09-23 11:22:19 ET

**Serial Number:** 74168921 Assignment Information Trademark Document Retrieval

**Registration Number:** 1681891

**Mark (words only):** SMART TOUCH

**Standard Character claim:** No

**Current Status:** This registration has been renewed.

**Date of Status:** 2002-02-07

**Filing Date:** 1991-05-22

**Transformed into a National Application:** No

**Registration Date:** 1992-04-07

**Register:** Principal

**Law Office Assigned:** LAW OFFICE 4

If you are the applicant or applicant's attorney and have questions about this file, please contact the Trademark Assistance Center at TrademarkAssistanceCenter@uspto.gov

**Current Location:** 40S - Scanning On Demand

**Date In Location:** 2007-12-28

---

#### LAST APPLICANT(S)/OWNER(S) OF RECORD

---

##### 1. NARTRON CORPORATION

**Address:**

NARTRON CORPORATION

5000 N. U.S. 131

Reed City, MI 49677

United States

**Legal Entity Type:** Corporation

**State or Country of Incorporation:** Michigan

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### GOODS AND/OR SERVICES

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**International Class:** 009

**Class Status:** Active

electronic proximity sensors and switching devices

**Basis:** 1(a)

**First Use Date:** 1986-12-17

**First Use in Commerce Date:** 1988-01-07

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### ADDITIONAL INFORMATION

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(NOT AVAILABLE)

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### MADRID PROTOCOL INFORMATION

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(NOT AVAILABLE)

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### PROSECUTION HISTORY

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**NOTE: To view any document referenced below, click on the link to "Trademark Document Retrieval" shown near the top of this page.**

2007-12-28 - Case File In TIGRS

2002-02-07 - First renewal 10 year

2002-02-07 - Section 8 (10-year) accepted/ Section 9 granted

2001-12-06 - Combined Section 8 (10-year)/Section 9 filed

1998-04-11 - Section 8 (6-year) accepted & Section 15 acknowledged

1997-11-24 - Section 8 (6-year) and Section 15 Filed

1992-04-07 - Registered - Principal Register

1992-01-14 - Published for opposition

1991-12-13 - Notice of publication

9/23/2010

Latest Status Info

1991-09-09 - Approved for Pub - Principal Register (Initial exam)

1991-08-26 - Assigned To Examiner

1991-07-22 - Communication received from applicant

---

### ATTORNEY/CORRESPONDENT INFORMATION

---

#### **Correspondent**

ELIZABETH F. JANDA  
BROOKS & KUSHMAN PC  
1000 TOWN CTR 22TH FL  
SOUTHFIELD MI 48075

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Announcing...

# SMART TOUCH<sup>TM</sup>

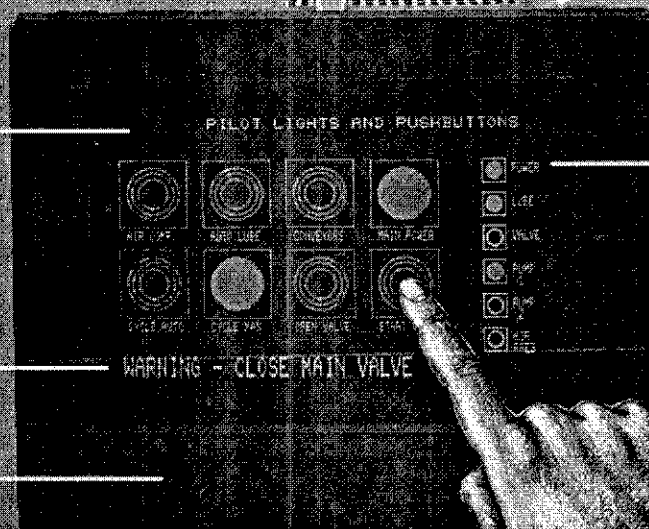
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tom panels fast

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- Operates like a control panel...but with instant response, quick change.
- Touch screen to "Actuate" graphic controls...audible acknowledgment.
- Easy Programming...within the unit.
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Respondent.

---

**EXHIBIT 3**

## Autos

Make msn.com your home page

## Car Tech Trends for 2010 — and Beyond

What does the future hold for drivers and their vehicles? We take a look.

By **Erik Sofge** of MSN Autos

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Be the first of your friends to like this.



[Click to enlarge picture](#)

The technology used to support and pilot hybrid and electric vehicles, like this Tesla Model S, is changing the automotive landscape faster than you think.

### Related Links

[Bing: Car Tech Trends](#)  
[The Coolest New Car Tech 2009](#)

same display. The Range Rover also integrates more controls into its touch-screen interface than previous models, further proof that knobs, buttons and other "hard" controls are an endangered interface.

[Video: Today Show: High-Tech Highway Help](#)

### This Decade: Augmented Reality

The technology is still in its infancy, but augmented reality — the combination of a real image with a virtual one — is about to grow up fast. Wikitude Drive, a relatively modest in-car navigation application for the Android mobile phone platform, offers a glimpse of AR's potential. Instead of looking at a digital overhead view of your next turn, Wikitude Drive floats the relevant data over a live view from the phone's camera. Similarly, researchers are already at work developing AR systems that use heads-up displays to tag potential hazards with warning symbols, while [BMW](#) has unveiled a somewhat wackier concept: goggles that let mechanics watch instructional videos as they work on a vehicle. In-vehicle AR offers engineers a chance to make windshield-projected heads-up displays as useful, and as ubiquitous, as they should be.

[Bing: Augmented Reality](#)

### This Century: Intelligent Vehicles

Forget about the possibility of an Intelligent Highway: the long-suffering initiative to develop a network of smart roads, smarter cars and safer drivers. After decades of research and hundreds of millions in funding, the prospect of installing communication devices throughout the nation's highways is as daunting as ever. However, vehicles that speak to one another, using a combination of GPS data and short-range wireless signals, would dodge the infrastructure pitfall entirely. At the recent Frankfurt Motor Show, [Audi](#) showed an electric version of the Quattro, called the [e-Tron](#), featuring an onboard communications system that analyzes traffic flow and traffic-light timing to present a driving route that's optimized for energy efficiency. The result of a more universal intelligent vehicle network could range from the simple, such as instant traffic advisories and collision alerts based on signals ahead, to the sublime — vehicles digitally chained together, each one dutifully following the lead vehicle's commands. Daimler tested one such "platoon" of trucks in 2003 and, earlier this year, researchers from the Southwest Research Institute in San Antonio conducted a similar, three-vehicle demonstration in Washington, D.C. With its combination of autonomous driving and old-fashioned drafting, platooning could reduce traffic congestion and improve fuel economy. That's just one possible application of intelligent vehicles — a milestone on the road to the fully self-driven automobile.

[Read: Five Ways Your Car Can Drive Itself, Today](#)

### 2. MATERIALS

#### This Year: Bioplastics

It's easy to oversell the novelty of so-called bioplastics — which contain varying amounts of organic materials such as corn, kelp or soy — and it doesn't mean you can gnaw on the seat cushions of the 2010 [Lexus HS 250h](#) if you're feeling a little puckish. Bioplastics are still plastic, though they

contain less petroleum and result in a lower carbon footprint for automakers. The current environmental vulnerability of bioplastics, which can degrade when exposed to moisture and sunlight, makes them a better fit for interior components. But as researchers experiment with new organic compounds and more durable manufacturing techniques, analysts expect bioplastics to gradually replace traditional plastics, possibly even replacing today's door panels and other exterior components with a more sustainable alternative.

[Discuss: Which of these tech trends hold the most promise for the future, and why?](#)

#### **This Decade: Nanomaterials**

Similar to the low-key replacement of traditional plastics with organically derived ones, tomorrow's cars will be increasingly tweaked at the submicroscopic scale, with little to no fanfare. The most obvious target is lithium-ion batteries. Researchers have experimented for years with carbon nanotube arrays (essentially creating a nubby finish, with more surface area than a flat component) to boost the efficiency of cathodes and anodes, meaning less energy lost during charging and discharging. Nanotechnology could also help researchers boost battery safety, allowing them to fine-tune the complex and potentially explosive architecture of hybrid and electric-vehicle battery packs. "Nanotech allows us to custom-make the electrodes, to look even more closely at the way the molecules fit together," says Don Hillebrand, director of the Center for Transportation Research at Argonne National Laboratory in Illinois. "We can push those reactive plates closer together, and get more efficiency out of the battery, but without letting those reactive materials touch." Because, as Hillebrand points out, reactive materials that do touch can set off what battery researchers call a "thermal event" — what the rest of us call an explosion.

[Video: Batteries: The New Oil?](#)

[Click to enlarge picture](#)



Chris Churchill (left) and John Shaw conduct experiments on shape memory alloys in the Smart Materials and Structures Lab at the University of Michigan Engineering School in Ann Arbor, Michigan.

#### **This Century: Smart Materials**

The most dramatic trend in automotive materials could also be the spookiest. Smart alloys, like the ones pioneered by researchers at General Motors, could allow for morphing spoilers and air dams that flow into place on demand, and door panels and bumpers that reshape themselves after a collision. These materials are heat-activated, becoming flexible at higher temperatures, and snapping back into shape as they cool. The first applications of smart materials will be subtle. As early as next year, GM expects to introduce grab handles that automatically pivot into place when you open a door. However, large-component implementation means answering tough questions. How do you seam-weld panels that are designed to shrivel under heat? Do you incorporate onboard heating elements to activate specific smart alloy components, or funnel waste heat from the engine or battery pack? An industry focused on the economics and logistics of rapid, bulk assembly will have to pioneer new manufacturing techniques to accommodate shape-shifting alloys. With GM already leading the way in smart materials, and hungry for a new image, nothing says high-tech reinvention like a car that transforms at the push of a button.

[Read: A Car Made Out of What?](#)

### **3. POWER**

#### **This Year: Clean Diesels**

For many American drivers, diesels can be a tough choice. Contrary to the discount associated with diesel overseas, in some parts of the U.S. the fuel costs anywhere from 25 to 50 percent more than gasoline. That hasn't stopped automakers from pushing harder than ever for new diesel vehicles. As of this year, Audi, BMW, [Mercedes](#) and [Volkswagen](#) are all selling clean diesels stateside. After all, few experts believe gas prices will remain low over the long term. And according to Hillebrand, it isn't the cost of diesel we should be focusing on, or even the 20 to 30 percent boost in fuel economy. "It's easier to run biofuels on a diesel," he says. "We might have bankrupted the ethanol companies, but non-corn-based cellulosic ethanol is going to come back strong. When you look at using algae to produce biofuels, the yields are phenomenal, and you're not even displacing production farmland." Diesel sales might continue to disappoint, but as more models become available, the better the United States will be prepared for biofuel's second act.

[Video: Weather Channel: Decoding the Biofuel Buzz](#)

#### **This Decade: Ultracapacitors**

Lithium-ion batteries are powering the next generation of hybrids, plug-ins, range extenders and every other kind of electric vehicle, and for a very good reason: energy density. But they're also incredibly heavy; they require valuable metals such as platinum; and, on rare occasions, they suffer "thermal events," turning cell phones and laptops into incendiary devices. "That's why we make lithium-ion batteries about 40 percent bigger than they need to be," Hillebrand says. By avoiding deep discharges, where nearly all of the battery pack's capacity is drained, the chances of a catastrophic chain reaction are reduced. The solution could be ultracapacitors, which are essentially low-capacity, high-stability batteries, able to charge and discharge quickly with no chance of blowing up. "We're working on a series of batteries that are composed of lithium-ion cells and ultracaps," Hillebrand says. "The ultracaps act as shock absorbers for the power slamming in and out, and then the lithium-ion cells have the capacity. And you use less lithium-ion, which brings down the weight." None of the major carmakers has announced plans to incorporate ultracapacitors in their vehicles, but once lithium-ion's energy density begins to top out and rare metal reserves dry up, ultracaps might be the only option left.

[Discuss: Which of these tech trends hold the most promise for the future, and why?](#)

#### **This Century: Vehicle-to-Grid Charging**

One potential benefit of an influx of electric vehicles is the creation of a vast network of backup batteries, with plugged-in cars feeding power back into the grid at critical moments to help avoid outages. If altruism isn't enough of a reward, EV owners who join the battery reserves could be credited or paid for their occasional output. This type of capacity could mean overhauling the nation's core electricity infrastructure, creating a truly smart grid with two-way digital bandwidth on most power lines. Or it could simply mean more advanced car chargers and/or smart meters, which would communicate wirelessly with the local grid manager. Whatever the approach, widespread vehicle-to-grid charging could mean years more research and millions in funding, but the payoff — for the utilities, as well as consumers — seems too interesting to pass up.



Visit MSN Autos' "[Exhaust Notes" blog](#) to keep up with the latest automotive tech trends.

*Based out of the Boston area, Erik Sofge is frequent contributor to Popular Mechanics and Slate.com. He specializes in everything scientific and technical.*

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Credit: © Tesla Motors, Inc.

Car Tech Trends for 2010 — and Beyond

The technology used to support and pilot hybrid and electric vehicles, like this Tesla Model S, is changing the automotive landscape faster than you think.

More Pictures

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### Car Tech Trends for 2010 — and Beyond

Dashboards with analog dials and controls are fastly becoming a thing of the past. Touch-screens like this one in Chrysler's 200C EV Concept are the wave of the future.

#### More Pictures

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Credit: © Chrysler Group LLC



Credit: © Mobilizy

Car Tech Trends for 2010 — and Beyond

Wikitude Drive, a modestly priced in-car navigation application for the Android mobile phone platform, shows what can be achieved by superimposing a real image over a virtual one.

More Pictures

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Credit: © Toyota Motor Sales, U.S.A.

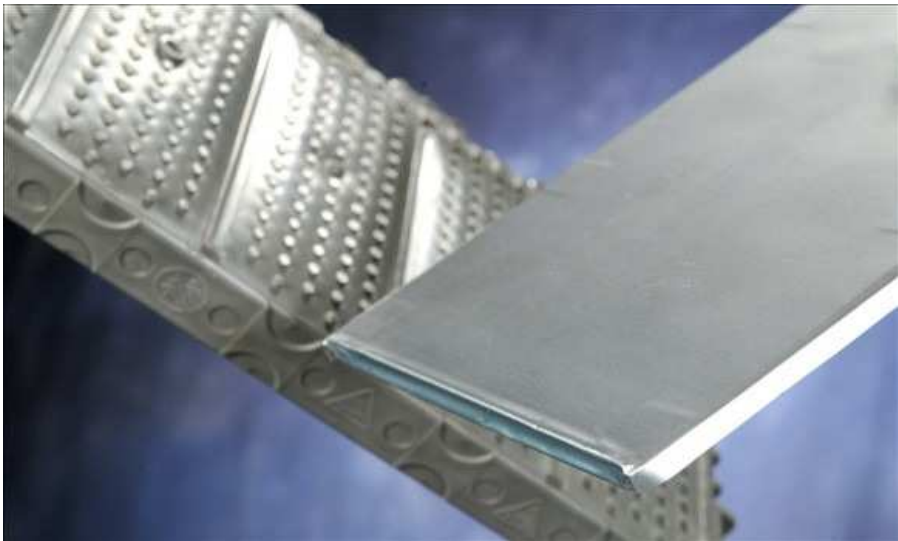
### Car Tech Trends for 2010 — and Beyond

Bioplastics, like those found in the seat cushions of this 2010 Lexus HS 250h, contain varying amounts of organic materials such as corn, kelp or soy.

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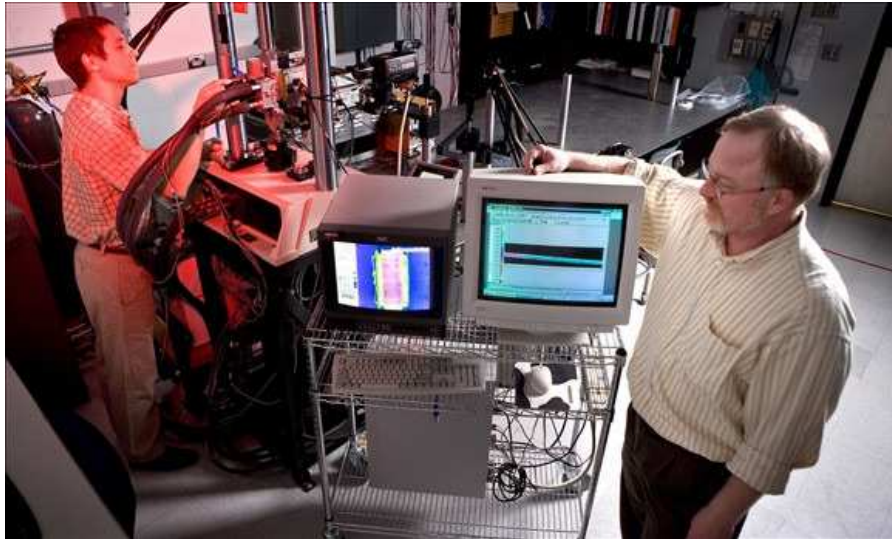
Car Tech Trends for 2010 — and Beyond

The newest generation of lithium-ion battery (foreground) has an energy density three times that of the batteries in today's electric cars (background).

More Pictures

Select a gallery 

Credit: © Argonne National Laboratory



### Car Tech Trends for 2010 — and Beyond

Chris Churchill (left) and John Shaw conduct experiments on shape memory alloys in the Smart Materials and Structures Lab at the University of Michigan Engineering School in Ann Arbor, Michigan.

#### More Pictures

Select a gallery





Credit: © Rod Hatfield

### Car Tech Trends for 2010 — and Beyond

Diesel-powered vehicles, like this 2010 Audi A3, get a fuel-economy boost of up to 30 percent when compared to their gasoline counterparts.

#### More Pictures

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Credit: © Argonne National Laboratory

### Car Tech Trends for 2010 — and Beyond

These ultracapacitors will dramatically boost the power of lithium-ion batteries, enabling plug-in hybrid electric vehicles to travel much farther on a single charge.

#### More Pictures

Select a gallery







Credit: © Ford Motor Company and Wieck Media Services, Inc.

### Car Tech Trends for 2010 — and Beyond

Widespread vehicle-to-grid communications, like this proposal from Ford, could mean years more research and millions in funding, but the payoff — for the utilities, as well as consumers — seems too interesting to pass up.

#### More Pictures

Select a gallery



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Petitioner,

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Respondent.

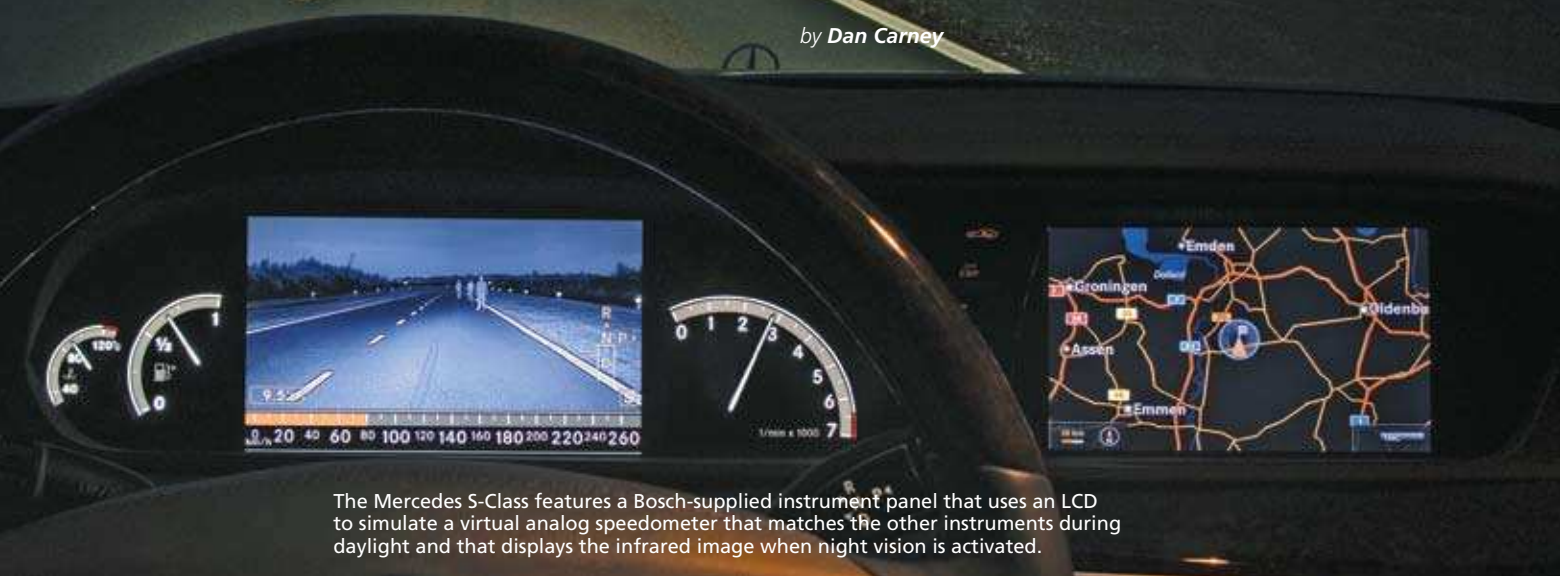
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**EXHIBIT 4**

# Virtual revolution

Liquid crystal displays are replacing analog gauges to give drivers more information in a reconfigurable format.

by Dan Carney



The Mercedes S-Class features a Bosch-supplied instrument panel that uses an LCD to simulate a virtual analog speedometer that matches the other instruments during daylight and that displays the infrared image when night vision is activated.

Looking back to the dawn of the automotive era, the methods of steering, shifting, braking, and controlling the throttle have evolved significantly. But over that time, the method of instrumenting cars has seen very little change. There has been some dabbling in linear analog and digital instruments, but the overwhelming standard has been the circular clock-like analog gauges inherited from steam engines.

Finally, with the arrival of virtual instrument panels based on reconfigurable LCD (liquid crystal display) panels, there is the potential for that familiar interface to be replaced. But those circular analog gauges, with their moving pointers, lasted as long as they did because they are a good way to convey important information at a glance, so one of the main things these new video panels may be used to display is a simulation of physical gauges.

The benefit lies in them being able to alternatively show other information as needed. That means the ability to display video images from backup cameras, for example. But it also means the ability to display information about new alternative drivetrain systems, which may not be best depicted in the familiar analog format.

## Technical challenges

"In the automotive space, there is a lot of interest in LCD for lots of different reasons," said Scott Birnbaum, Vice President of the LCD business for **Samsung**. "It is more flexible than an analog device that has a single purpose because it can be changed in real time to change its purpose," he said.

While Samsung is the world's largest LCD manufacturer, Birnbaum said, automotive LCDs present unique challenges for the company. That is because they must be made more rugged, so that drivers can depend on them to work for the life of the car, under a variety of conditions. Chief among those conditions is the wide range of temperatures seen inside automotive cabins.

A closed car baking in the sun can get extremely hot, potentially pushing an LCD beyond its "clearing temperature," when it turns black and may stay that way, Birnbaum said. The solution is to specify a liquid crystal in the display with a higher clearing temperature, he said. Heat can be mitigated through careful design including airflow paths and heat diffusers. At low temperatures, LCDs can respond sluggishly, so again, it is necessary to specify a liquid that is less sensitive to lower temperatures, Birnbaum explained.

The bright sunlight inside cars can also make it hard to see an LCD screen because of glare, so the image needs to be bright enough to stand out. LCD makers address this with a combination of bright backlighting and anti-reflective films on the glass to reduce glare.

## On the road

The first example of a car with virtual instruments on the U.S. market was on the 2007 **Mercedes-Benz S-Class**, which employed an 8-in LCD panel in the center of an instrument cluster.

ter, directly ahead of the driver, flanked on both sides by conventional physical gauges.

Under most circumstances, the LCD screen renders a convincing imitation of a circular analog speedometer matching the other gauges. But when the car's night-vision system is activated, the screen shows an infrared image of the road ahead, with speed indicated by a linear analog indicator across its lower edge.

Another methodology employed for the instrument panel in the **Ford Fusion** hybrid, which inverts the Mercedes approach, uses only a physical speedometer at the center of the instrument cluster and flanks it with a pair of 4.3-in LCDs that show all of the additional information.

These high-resolution color displays permit the Fusion to provide a huge amount of information and to exhibit it in innovative new ways, explained Sonya Nematollahi, Driver Information Engineering Supervisor at Ford.

Using a pair of smaller displays rather than one large one helps contain costs, because it uses LCDs from the extremely high-volume consumer electronics, handheld game, and cell phone sectors, explained Birnbaum. This approach results in a reconfigurable display covering a large area of the dash, which costs only about twice as much as a conventional instrument panel, according to Nematollahi.

In contrast, using a single display large enough to replace all the physical gauges can be expected to quadruple the cost of the instrument panel, at least in the near term, reported James Farrell, Senior Manager of Driver Information Platforms and Advanced Projects at **Visteon Corp.**

Visteon has just such a product that will debut in a European model imminently, Farrell said. It has a 1280 x 480-pixel, 12.3-in single LCD panel replacing all the traditional instruments. This market may grow only gradually, but Farrell predicts that by 2013, 5% of new cars will use a single large LCD panel for driver information, and another 20% will use at least one small LCD in the 4- to 5-in range to supplant some instrumentation.

One problem with traditional analog gauges is that tradition had become tyrannical, forcing unneeded gauges into

vehicles where they are inappropriate, asserted Rodger Eich, Studio Design Manager for Electronics Design Studio, North America for **Johnson Controls, Inc. (JCI)**. Because of customer expectations, manufacturers have been installing tachometers in vehicles such as minivans equipped with automatic transmissions, he pointed out. "That tachometer is no longer relevant" in that application, Eich said.

### The medium is the message

Manufacturers should instead use the space on the dashboard to provide information that is relevant to drivers, he said. It takes careful research to learn what information drivers can use instead. The price for failing to understand drivers' requirements is to have a new display consigned to the dustbin of history with the widely disliked digital

instruments of the 1980s, or failing to live up to the promised benefits, as was the case with the **Apple** Newton personal digital assistant, Eich said.

Manufacturers and suppliers are working to divine customers' needs, in some cases consulting with companies like **IDEO**, an industrial strategy and design company. Drivers' needs are changing along with the vehicles they are piloting.

Just as an automatic-transmission minivan has little need for a tachometer, so do vehicles with emerging powertrains have need for many of the old instruments. What good is an oil pressure gauge on a battery-electric car? And is a tachometer particularly useful on a hybrid-electric, which may not be using its internal-combustion engine?

"[Ford engineers] were faced with the question of, 'We can get any data



The Buick Reatta pioneered the use of a video screen in 1988 with this instrument panel, which featured both digital instruments and a reconfigurable CRT display.

The Johnson Controls-supplied instrument panel in the Ford Fusion hybrid employs a pair of cost-effective 4.3-in LCDs flanking a conventional speedometer to provide ample space for innovative new driver information tools.





Visteon predicts that hybrid instrument panels like this one, which combines a 4.3-in central LCD screen with a pair of conventional analog gauges, will become very popular because of its combination of flexibility and low cost.



The Chrysler 200C concept car's instrument panel envisions a seamless display that combines information with control of entertainment and climate control devices using touch screens.



Visteon's RE3 concept instrument panel places a smaller LCD directly ahead of the driver and supplements it with a larger panel to the right, letting the driver move data front-and-center as needed.



about the car, but what is meaningful to the person who is driving that is going to get them to drive it better?" recalled Steve Bishop, SmartGauge Project Leader for IDEO.

The company surveyed drivers of models considered most similar to the Fusion hybrid to consider their experiences with the instruments they had to learn what they could most use. The most significant outcome of this research was the conclusion to have the gauges employ the philosophy of a coach providing guidance, explained Bishop.

A couple of the most important manifestations of this approach are the green-leaf scoring system that rewards efficient driving with a graphical depiction of green plants growing

more leaves. Another is the sliding scale overlaying the tachometer that indicates the throttle range in which the car can run in battery-electric mode without starting the gasoline engine.

IDEO discovered that **Toyota** Prius drivers were oozing slowly around town in the hope of not triggering the gasoline engine to start without ever knowing where that threshold lay. For the Fusion hybrid's SmartGauge, the team designed an overlay band that appears on the virtual representation of a linear tachometer whenever the conditions are right for the car to run in electric-only mode. This lets drivers accelerate at the threshold of gas engine start, if it is their goal to avoid that happening, and is an example of a new representation of data not relevant in traditional cars.

### Degree of difficulty

Interestingly, while deciding how to best display information is the most substantial strategic challenge for designers of reconfigurable LCD instrument clusters, one of the bigger technical challenges is accurately "faking plain old analog gauges," reported Farell.

"The analog gauges are very important regardless of whether you have a traditional analog cluster or a reconfigurable cluster," he said. The anti-aliasing of thin, straight pointer needles is critical because otherwise they suffer the kind of "jaggies" seen in poorly rendered typefaces. It is also tricky to simulate a smooth sweeping movement of that needle. "The eye can quickly tell if you have skipped a step in the pointer movement," Farell said.

Because sports cars, along with luxury models, are expected to be some of the primary applications for reconfigurable LCD instrument panels, obvious options for such cars would be to have a large tachometer in the center, with other parts of the dash showing performance parameters or lap times, Farell suggested. "The important thing is being able to display what the driver needs depending on what is going on," he said.

In addition to designing the display of information on the dashboard, developers must also decide how drivers will be able to manipulate that information. JCI forecasts the use of capacitive iPhone-like touch screens that recognize gestures. Using a two-screen design, with a smaller 4.3-in display directly ahead of the driver and a larger 7-in display to the driver's right, JCI's touch-screen system works a bit like a dual-monitor computer setup, with the driver able to move information from one screen to the other as needed, explained Eich.

"It is a compelling way to manage content and information within an extended cluster," he said. The concept was developed after significant research into drivers' experiences with other devices to ensure its use was understandable. "We want to make sure our technology aligns with what consumers expectations are."

The impressive virtual dashboard in Chrysler's 200C concept car may be the most complete depiction of the eventual end result of the trend, with a large, irregularly shaped display wrapped to fit the contours of the dashboard and responding to touch inputs.

"We're very excited about this," enthused Brad Gieske, a visualization designer for Chrysler. "We feel very strongly this is where the future is headed," he said. But as the display becomes larger and more capable, so does the need to refine its interaction with drivers. "A lot of usability studies need to be done," concluded Gieske. **aei**



## Too much hybrid hype

In "Future of plug-in hybrids forecast by panel" (February 2009, page 34), may I point out that all hybrid-electric vehicles (including PHEVs) captured only 3% market share at the height of gas prices last summer. It dropped back to about 2% since, and may stay. I (we) support plug-in hybrid-electric vehicles, but they need to do better than 40-mi range to be a major player. HEVs are going to be only niche players.

Yes, there is too much hype about hybrids that we lose sight of the venerable internal-combustion engine (ICE).

Hybrids use a small engine to operate near the "sweet spot" and an external storage to boost to higher loads, besides recovering energy waste from brakes, etc. The round trip to storage loses about half of the energy. The main efficiency comes from engine downsizing; waste recovery has small percentage except from idling. Cylinder deactivation is just as efficient as the hybrid, but without the cost premium.

We believe a revolutionary ICE is the immediate future, such as the D-cycle. Four-cycle engines deliver one-fifth or less of the fuel energy input to the engine to drive cars. There is still ample beef in this century-old ICE technology to chew on.

We cannot dream on the long-term ideal solutions like fuel cells, batteries, hybrids, etc., while we continue to burn hundreds of millions of gallons of fuel every day, times 365. Detroit and the country need immediate solutions.

*MJ Yan, PhD  
CEO*

*GENWY Power Technology Ltd.*

## Wiring worries

In the "Lighten up!" feature (March 2009, page 16), we learn that the next Toyota Yaris will have an aluminum wiring harness. Not for me, thanks.

In the late '60s and early '70s, nearly half a million homes in Canada (and no doubt quite a few in the U.S.) were fitted with aluminum wiring because of a spike in the price of copper, and oxidation at connections caused flickering lights, power outages, and fires. Aluminum oxide

is nonconductive, unlike copper oxide, and overheats.

Once word got around, houses could not be resold until the wiring was ripped out and replaced, accompanied by major re-plastering. Less drastic alternative workarounds may have satisfied insurance companies but did not return the houses to their normal market values.

Domestic house wiring is well protected. In an automobile, it is exposed to vibration, humidity, and road salt. My present car has trouble-free electrics, and I would not want to replace it with one having a built-in risk factor.

*Garry Marnoch  
Former General Motors engineer  
Pontypool, Ontario, Canada*

## In touch

The "Touching the future" feature (March 2009, page 28) is timely. The exciting Chrysler 200C interior reveals exacting clarity of design (which we humans call "beauty") without sacrificing function, as empowered by the Nartron Smart Touch capacitive pioneering technology.

*Norman Rautiola  
CEO  
Nartron Corp.*

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Petitioner,

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**EXHIBIT 2**

# Auto shows turn heads for Reed City company

By Matt Whetstone

**REED CITY** - Imagine a world without buttons. Or levers. Or knobs.

Nartron has. And now the Reed City-based manufacturer is beginning to see how big that vision could become.

Following the Detroit Auto Show, Nartron's

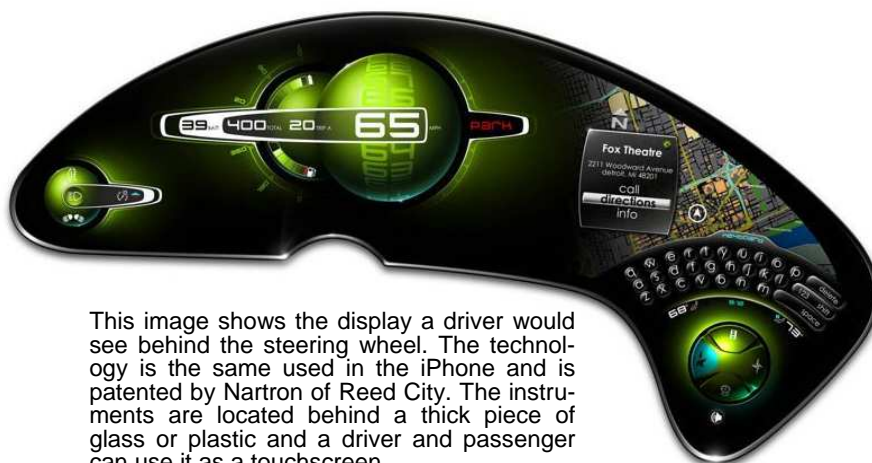
Smart Touch technology created a lot of buzz for the manufacturer among domestic automakers.

At the New York Auto Show this week, Nartron founder Norm Rautiola said international automakers are turning their attention Nartron's way, too.

Nartron has worked with Chrysler to install the Smart Touch technology in some of its auto show vehicles. The result is a large, button-free interface that is interactive for drivers and passengers.

Basically, it's an iPhone for your car, as Nartron owns the patents behind the technology that makes the iPhone work.

"This is really big stuff that's going to change the industry," Rautiola said. "Now, we have luxury at a cost savings. Nobody does that. With the solid-state,



This image shows the display a driver would see behind the steering wheel. The technology is the same used in the iPhone and is patented by Nartron of Reed City. The instruments are located behind a thick piece of glass or plastic and a driver and passenger can use it as a touchscreen.

touch-screen technology, everything can be made in any structure."

What a driver normally would see behind a steering wheel is a mish-mash of panels, buttons and gauges. The Smart Touch puts all that behind a thick, solid piece of plastic or glass without sacrificing user-friendliness. When the driver touches a display for the car's windows, the windows go up or down.

"People ask how to interact with something behind the glass," Rautiola said. "It senses you when you wipe your finger or use multiple fingers. All buttons, knobs and levers are eliminated. That's where the cost savings is. There's nothing to rattle or stick out and break up the feeling of the sculptured design."

With the solid-state, touch-screen technology, Rautiola said designers can create clean, sculptured lines without losing any function and at a cheaper price than before.

Interest in Nartron's technology has exploded in the last year. Rautiola said it was tough to drum-up interest in the product outside of Chrysler. Once the technology was revealed, however, more and more interested parties came calling.

"What that means is some interesting and exciting things in this dreary north," Rautiola said. "I'm not sure where this is going to go, but it's going to keep rolling."

## Nartron Technology

The iQ Power™ solid state touch screen systems use powerful MPA (multi-point activation), proprietary Smart Touch® technology to empower the user to simply reach and come close to its surface (which illuminates the IP), and with a flick or gesture of a finger, quickly scroll through a wide variety menu options such as climate, music, GPS, etc.

Wide design freedom in instrument panel styling/function is instantly achieved. Elegantly sculptured contours with cool, sleek displays bring "touch Trackball control of IP functions screen envy" to the car cockpit for the first time.

iQ Power™ systems dramatically improve functionality while costing much less than traditional knobs and buttons. Easy to use screens reduce driver distraction and significantly improve safety. A breakthrough in reliability. As the inventor of Smart Touch®, our more than 20 years capacitive touch screen design experience makes us the only choice when you need the HMI power enhancement of multi-point activation.

Source: Nartron







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Source: Nartron

Auto show accolades

The Chrysler 200C EV received Best Concept recognition by several national writers at the Detroit Auto Show.

Automotive journalist Rex Roy wrote the car "caught everybody by surprise."

"While the exterior of the little 200 is handsome and the electric powertrain is politically correct (and politically expedient), the 200C EV gets my vote because of its instrument cluster."

That cluster was developed by Chrysler and Nartron. Roy also predicts where the technology is going.

"Expect to see this technology on carts within the next decade..." he wrote.

Automotive journalist Marty Padgett added this: "...this sleek, techno-savvy concept could be Chryslers bridge to sustainability."

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NARTRON CORPORATION

Petitioner,

v.

Cancellation No. 92050789

HEWLETT-PACKARD  
DEVELOPMENT COMPANY, L.P.,

Respondent.

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**EXHIBIT 5**

# Cypress's PSoC(R) CapSense Enables Touch Sensing Inside HP Compaq Notebook PCs

SAN JOSE, Calif.—(BUSINESS WIRE)—May 9, 2007— Cypress Semiconductor Corp. (NYSE: [CY](#)) today announced that its PSoC(R) CapSense enables the touch sensing interface inside multiple HP Compaq Notebook PC models. The Cypress CapSense solution not only provides the interface for a smooth, glitch-free user experience, but it also controls LED indicator lights on the notebooks, saving board space and reducing costs.

"We are pleased to provide the CapSense solution to HP, a world leader in notebook computers," said Carl Brasek, business unit director for Cypress's CapSense products. "This usage model highlights one of the CapSense customer benefits -- the ability to perform additional functions on top of capacitive sensing."

"Given HP's focus on delivering easy-to-use and reliable notebook PCs to our business customers, HP is pleased to integrate the CapSense solution, which provides an excellent user experience and is less prone to every day wear and tear than exposed buttons," said Carol Hess-Nickels, director of worldwide business notebook marketing in the Personal Systems Group at HP. "In addition, the CapSense solution enhances the sleek design and superb functionality we're providing to customers."

## About CapSense

A single CapSense device can replace dozens of mechanical switches and controls with a simple, touch-sensitive interface. CapSense-based "button" and "slider" controls are more reliable than their mechanical counterparts because they are not prone to the environmental wear-and-tear that affects exposed buttons and switches. Cypress has garnered well over 100 CapSense design wins worldwide in applications that include mobile handsets, portable media players, white goods, computers, printers and automotive, among others.

Capacitive sensing is fast becoming the solution of choice for front-panel display and media control applications. Increased durability, decreased bill of materials (BOM) and a clean, minimalist appearance make this elegant interface attractive to a wide range of designs. With Cypress's CapSense interface, a finger on the interface forms an electrical connection with embedded sensors, which work with the PSoC device to translate data about the finger's presence into various system control functions. The sensor itself is only a copper pad on the PCB, not an actual component. All of the circuitry for controlling the sensor is inside the PSoC device.

Cypress's CapSense solution offers system designers numerous advantages over capacitive sensing products built around modules and sub-assemblies, including increased flexibility, reduced board space and lower cost. Because of the unique PSoC architecture, designers can easily integrate multiple functions (e.g., LED drivers and LCD displays), in addition to capacitive sensing. The PSoC CapSense solution also delivers benefits such as easy communications using either I2C, SPI or USB interfaces, the ability to implement both trackpad (x-y matrix) and linear slider applications with the same device, and the ability to make quick design changes using the flash-based PSoC architecture. In addition, users can complete CapSense designs quickly and easily using pre-configured and verified "user modules" within Cypress's PSoC Designer(TM) 4.4 Integrated Design Environment (IDE). Learn more about CapSense online at [www.cypress.com/capsense](http://www.cypress.com/capsense).

## About the PSoC Family

PSoC devices are configurable mixed signal arrays that integrate a fast 8-bit microcontroller with many peripheral functions typically found in an embedded design. PSoC devices provide the advantages of an ASIC without the ASIC NRE or turn-around time. A single PSoC device can integrate as many as 100 peripheral functions with a microcontroller, saving customers design time, board space and power

consumption. Customers can save from 5 cents to as much as \$10 in system costs. Easy to use development tools enable designers to select configurable library elements to provide analog functions such as amplifiers, ADCs, DACs, filters and comparators and digital functions such as timers, counters, PWMs, SPI and UARTs. The PSoC family's analog features include rail-to-rail inputs, programmable gain amplifiers and up to 14-bit ADCs with exceptionally low noise, input leakage and voltage offset. PSoC devices include up to 32KB of Flash memory, 2KB of SRAM, an 8x8 multiplier with 32-bit accumulator, power and sleep monitoring circuits, and hardware I2C communications.

All PSoC devices are dynamically reconfigurable, enabling designers to create new system functions on-the-fly. Designers can achieve far greater than 100 percent utilization of the die, in many cases, by reconfiguring the same silicon for different functions at different times. Learn more about PSoC products at [www.cypress.com/psoc](http://www.cypress.com/psoc) and receive free online training at [www.cypress.com/psoctraining](http://www.cypress.com/psoctraining).

## About Cypress

Cypress delivers high-performance, mixed-signal, programmable solutions that provide customers with rapid time-to-market and exceptional system value. Cypress offerings include the PSoC(R) Programmable System-on-Chip(TM), USB controllers, general-purpose programmable clocks and memories. Cypress also offers wired and wireless connectivity solutions ranging from its WirelessUSB(TM) radio system-on-chip, to West Bridge(TM) and EZ-USB(R) FX2LP controllers that enhance connectivity and performance in multimedia handsets. Cypress serves numerous markets including consumer, computation, data communications, automotive, industrial, and solar power. Cypress trades on the NYSE under the ticker symbol CY. Visit Cypress online at [www.cypress.com](http://www.cypress.com).

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Don Parkman, 408-943-4885  
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**Rating:** ★★★★★



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**EXHIBIT 6**

# Smart Touch<sup>®</sup> sensing places the power of the microprocessor at your fingertips

Erin Kirby  
Nartron Corporation

Rachel Guerrero  
Sanyo Automotive U.S.A., Inc.

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## ABSTRACT

Smart Touch<sup>®</sup> sensing is a breakthrough in human interface technology allowing direct access to computer power, such as with the highly successful iPhone<sup>™</sup> and other handheld devices. By combining the reliability and flexibility of completely solid state sensing along with anthropometric considerations, capacitive sensing interface technology creates new automotive design opportunities.

Consumers are increasingly turning to touch screen devices for their ease of use. Touch screens enable designers to dramatically improve the automotive interior for (1) user satisfaction (2) OEM cost benefits (3) important safety/ergonomic benefits and (4) styling design freedom to harmonize with interior themes. Panels will not only act on touch, but will have functions that respond to hand gestures and movements. For example, a center stack console can be enabled to illuminate when the user makes a movement near it, with the added benefit of conserving power. Interfacing to a vehicle by capacitive sensing creates entirely new opportunities in the evolution of automotive interior design. The styling design possibilities are nearly endless providing freedoms that are unachievable with conventional switches.

This paper describes the design and operation of various systems that employ capacitive sensing technology. Also discussed are vehicle integration, ergonomic enhancements, and safety benefits associated with this technology.

## APPROACH

Capacitive sensors have several noteworthy features not found in conventional switches such as those in the automotive center stack console shown in Figure 1. The most apparent difference in capacitive sensors is that they do not require force for activation. By utilizing materials like indium oxides, conductive polymers, or other evolving nanomaterials, capacitive sensors can be fabricated as optically transparent films. This results in

capacitive sensors that are clear and thin enough to be placed in front of visual displays without noticeably degrading the optical clarity of the viewing area.



Fig. 1

Another key feature of capacitive sensors is that they can sense through relatively thick materials. Designers now have the option of integrating human interfaces into once unconventional locations such as the inside of trim panels, faceplates, moldings, and other such protective or ergonomic surfaces without disturbing the aesthetics of the finished product. Furthermore, capacitive sensors can form to complex contours and shapes providing virtually unlimited functional sensing geometries.

Applying capacitive sensors to a substrate in multiple or matrix configurations such as that shown in Figure 2 creates a versatile touch surface for human interface. Sensors activated by touch translate into coordinates that represent the points of human contact on the substrate surface. These contact points are processed by the control system into recognizable user input commands.

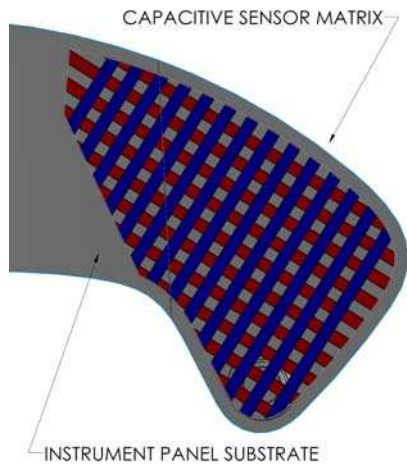


Fig. 2

Making the substrate and capacitive sensors largely translucent permits direct backlighting of the sensing areas. Backlighting can assist to locate the touch sensors and provide visual feedback of sensor activation.

In a more innovative approach, rear-projection technology can project light directly through the sensors to render images onto the surface of a substrate. When a sensor is activated, the image projected toward its position then corresponds to the users input request. If desired, sensor activation feedback can then be communicated through alteration of the projected image. Rear-projection offers the flexibility of displaying sharp images despite the complexity of a desired surface shape and contour. There are limitations in a rear-projection approach that must be taken into consideration by automotive interior designers:

1. Can enough light intensity be generated?
2. Heat build-up from the light source must be dissipated - This concern may be overcome by means such as air ventilation or the use of thermal electric devices.

As we move full speed into the information age automakers are constantly challenged by the consumer to provide vehicle features that will enhance their personal commuting experience and keep them connected to the world outside. As new features make their way into vehicles, the requirement is to provide a more logical and intuitive approach to managing the complexity of each human interface component.

## APPLICATION

Visualize a vehicle interface system where display gages and indicators can be moved anywhere about the Instrument Panel (IP) or Center Stack Console (CSC). Likewise, input sensors can also be positioned most

anywhere about the IP or CSC. The IP and CSC can then effectively be customized and set for the personal preferences of more than one driver. Expand the vision further by integrating the IP and CSC into a single contoured translucent substrate that flows around the steering column and down the center console area. Projectors illuminate the substrate from behind to create visual gages and indicators across the substrate surface. Likewise, the substrate is fabricated with multiple independent capacitive sensors as well as large areas of capacitive matrix sensors. Figure 3 shows a vehicle interior for application of capacitive touch sensors.

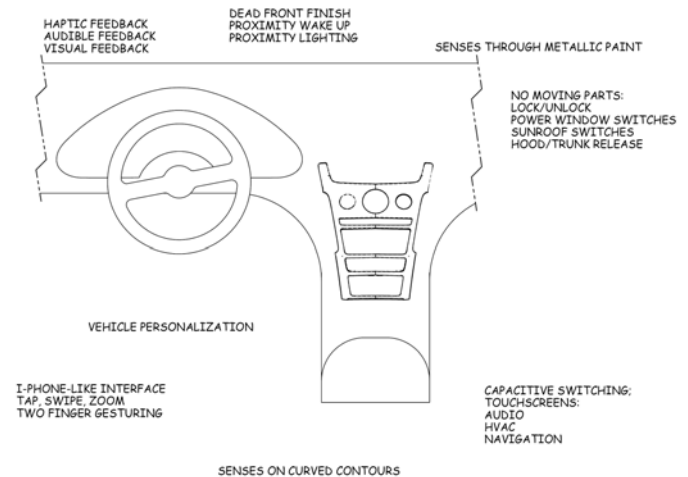


Fig. 3

Figure 4 shows the application of capacitive sensors in a center stack console integrated with conventional switches. The backlit blue text locations are capacitive touch sensors.



Fig. 4

As the vehicle occupant reaches towards the CSC, capacitive proximity multipoint activation sensors (PMAS) behind the substrate detect an approaching object and the display illuminates the CSC with primary command icons. These icons create a menu structure that provide access to vehicle features like audio

entertainment, climate control, navigation, video entertainment, telecom services, vehicle status, etc.

By touching one of the primary icons a new display appears having secondary icons related to the primary selection. The secondary icons depict items like graphics displays, status indicators, and command sensors. Touching any one of these icons would invoke a response from the system allowing the occupant to perform functions related to the icon. These functions could be as simple as turning the radio on or displaying vehicle status information. Or they could initiate more complex instructions like "retrieve and play voice messages".

Regardless of the function, a vehicle display system of this type would require a standard set of display images and control icons capable of accessing and managing the vehicle functions. The user would be free to locate the graphical images within the projected regions of the substrate to create customized instrumentation layouts.

Images might further be tailored using commands that could resize, rotate, or adjust image properties for preferred viewing. For example images representing oil pressure could be changed between analog readout, digital readout, or simple warning light. Frequently accessed indicators like speedometer, odometer, and fuel status could be fixed in position and remain illuminated while less important display features like audio tone controls could remain hidden and accessible from within entertainment submenus. Navigation and Infotainment screens could be minimized and positioned out of main view then maximized and relocated to a main viewing position when invoked.

In this vehicle system, dedicated function switches no longer exist. Instead capacitive sensors are actively reassigned functions based on the images that project through them at time of switch activation. In addition to switch reassignment, the control systems capacity to process capacitive sensor coordinates make possible the recognition commands through human gesture. By monitoring switch activation sequences, gesturing is used as a form of input command to further enhance the human touch interface.

PMAS enables directional finger gestures like swiping upward or downward across an icon or image to be decoded as requests to increase or decrease setting values in functions such as audio volume control. Finger gestures like pinch open and pinch close could be decoded as requests to enlarge and shrink images. While on a navigation screen, they could represent zoom in and zoom out commands to adjust the degree of screen detail. A "squiggle" gesture might be interpreted as a request to cancel an operation, for example "turn off radio" or "turn off climate control" when performed over the primary command icon.

## CONCLUSION

Configurable displays and capacitive sensors such as that presented here can reduce the visual clutter destined to plague many future vehicle cockpits. This degree of function integration takes human-computer interface to a new level and creates a more ergonomic and intuitive interface for the vehicle driver and passengers.

The absence of switch plates and display bezels produce seamless interior contours permitting greater artistic expression in vehicle interior design, as shown in Figure 5.

Automotive interior is an excellent application for capacitive sensors. Most interior surfaces of an automobile are made from non-conductive plastic which is ideal for capacitive sensors. With an ever increasing amount of creature comforts and entertainment features in demand and being integrated into vehicles, so increases the complexity of the interfaces needed to access and operate these features. Vehicle interior designers must be creative and open to new approaches on how occupants will access and interface to this growing list of vehicle features. Capacitive sensing offers a multitude of solutions to meet these needs.



Fig. 5

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
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**EXHIBIT 7**

7/21/10 Det. Free Press (KRT) (Pg. Unavail. Online)  
2010 WLNR 14542734

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**July 21, 2010**

BRIEF: GM gives \$2B contract to **Hewlett Packard**  
Greg Gardner  
Detroit Free Press

July 21--**General Motors** has **awarded a contract worth** more than \$2 billion to **Hewlett Packard** to cover an array of information technology for GM facilities worldwide.

The new agreement covers product development software, maintenance of networks for desktop computers and mobile devices, supplier management and financial transactions. It also renews the contract one year early and extends the two companies' 25-year relationship.

"GM's innovative business and in-vehicle technology strategy requires collaborative, cost-effective approaches so we can provide even better service to our customers as we design, build and sell the world's best cars and trucks," said Terry Kline, GM's chief information officer.

Historically, much of this work was provided to GM through its former subsidiary Electronic Data Services. HP acquired EDS in 2008 for about \$13.9 billion.

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**EXHIBIT 8**





## Financial news

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### General Motors Renews \$2 Billion HP Enterprise Services Agreement Supporting Vehicle Design and Production

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PALO ALTO, Calif., Jul 21, 2010 (BUSINESS WIRE) -- HP Enterprise Services today announced it has been awarded a multiyear applications and infrastructure services contract valued at more than \$2 billion to help General Motors Company maintain focus on its business goals in a highly competitive market.

Under the terms of the agreement, HP (NYSE:HPQ) will manage GM's technology infrastructure with a focus on providing an enhanced and continuously improving world-class end-user experience - from manufacturing plants to the boardroom. HP will provide network, workplace, mainframe management, applications and systems integration services for GM's global operations, including OnStar.

The new agreement covers a significant portion of HP's existing work with GM. It also renews the contract one year early and extends the two companies' 25-year relationship.

"GM's innovative business and in-vehicle technology strategy requires collaborative, cost-effective approaches so we can provide even better service to our customers as we design, build and sell the world's best cars and trucks," said Terry Kline, vice president, IT, and chief information officer, GM. "HP has been one of our most long-term, reliable partners with a team that has the expertise and creativity to help us quickly and successfully complete new phases of our business strategy."

HP will provide applications and infrastructure management services in support of tens of thousands of desktop PCs and mobile devices as well as GM's manufacturing and supply chain operations. Services include:

- Providing [applications development](#) and [management](#) services for product development, manufacturing, business services, supply chain, OnStar and more.
- Integrating a converged infrastructure and overall technology roadmap that supports GM's multisupplier technology environment.
- Providing [managed mainframe services](#) for GM's major business systems, including financial transactions and supply chain.
- Delivering HP global [service desk and site support services](#) in more than 50 countries and languages.
- Providing total remote network management for data, network security and videoconferencing services.

"The automotive industry is in the midst of a transformation and GM's technology infrastructure needs to be hitting on all cylinders to take full advantage of the potential market opportunities," said Tom Iannotti, senior vice president and general manager, HP Enterprise Services. "HP has a track record of outstanding service to GM that we will continue to deliver to help GM realize their business objectives."

HP [Agility Alliance](#) partners, including Microsoft and PricewaterhouseCoopers, will provide additional tools, technologies and resources to HP in support of GM.

#### About HP

HP creates new possibilities for technology to have a meaningful impact on people, businesses, governments and society. The world's largest technology company, HP brings together a portfolio that spans printing, personal computing, software, services and IT infrastructure to solve customer problems. More information about HP is available at <http://www.hp.com>.

This news release contains forward-looking statements that involve risks, uncertainties and assumptions. If such risks or uncertainties materialize or such assumptions prove incorrect, the results of HP and its consolidated subsidiaries could

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## HP in the Motor City

by [James Miller \(jim.miller\)](#) on 2010-08-03 06:26 PM - last edited on 2010-08-03 06:26 PM

Detroit, or the [Motor City](#), is often called [ground-zero](#) for the current economic recession. Recently there has been some encouraging news to help change this perception. [General Motors](#) announced pricing and lease rates for the exciting new Chevrolet [Volt](#) with plans to increase production by 50 percent. U.S. auto manufacturers are also experiencing the [strongest job growth](#) in more than 10 years. HP will play an important part in General Motors' future. The recent [\\$2 billion HP technology services contract](#) with General Motors utilizes workplace services, applications and systems integration services, as well as network and converged infrastructure components to help General Motors realize their business objectives and to bring technology innovation to the automotive industry. Innovation will be the foundation to transform the Motor City to meet future economic challenges.

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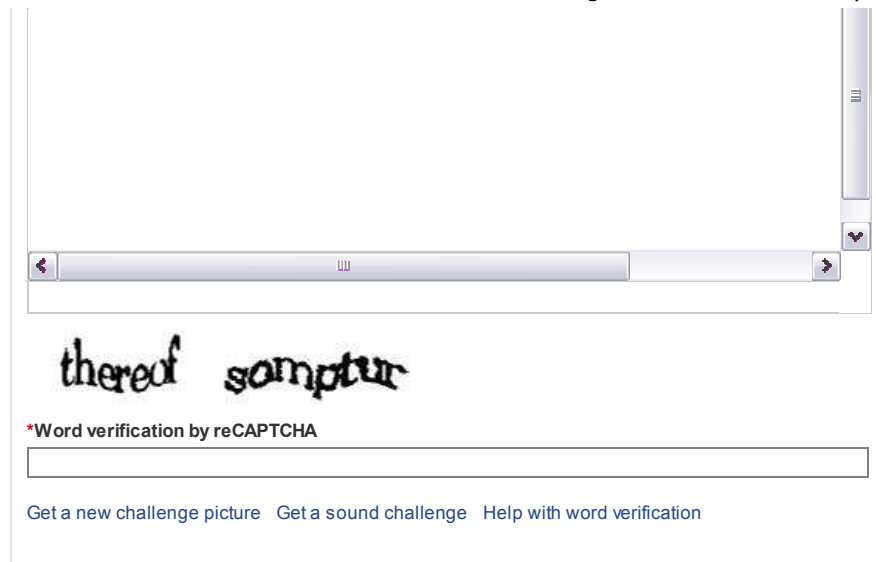
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